

Notice of Allowability

Application No.

09/988,601

Examiner

Minerva Rivero

Applicant(s)

DAILEY ET AL.

Art Unit

2655

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 11/20/2001.
2. ☒ The allowed claim(s) is/are 1-18.
3. ☒ The drawings filed on 20 November 2001 are accepted by the Examiner.
4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☐ All b) ☐ Some* c) ☐ None of the:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
 6. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO-1449 or PTO/SB/08),
Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit
of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☐ Interview Summary (PTO-413),
Paper No./Mail Date _____
7. ☐ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____

DETAILED ACTION

Allowable Subject Matter

1. Claims 1-18 are allowed.
2. Regarding claim 1, Solmer *et al.* (US 2002/0165717) disclose a method for a Hidden Markov model (HMM) based mark-up system, including the step of constructing a HMM defining a plurality of states (*sequences of states*, [0074]).

However, Solmer *et al.* do not disclose improving a HMM based mark-up system by modifying a Viterbi algorithm, related to the HMM, in order to apply a multiplicative factor if a particular state is re-entered; and executing the modified Viterbi algorithm against at least one information source.

3. Claims 2-11 are allowed because they further limit their parent claims.
4. Regarding claims 12 and 13, Solmer *et al.* disclose receiving a data sequence to be segmented (*extracted state sequences for a text document*, [0114]).

Solmer *et al.*, however, do not disclose invoking a Viterbi algorithm to label the received data sequence into a plurality of segment types; if a segment type is identified more than once during labeling, verifying which identification is correct; anchoring within the data sequence, labels verified as being correct; and invoking

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the Viterbi algorithm to label the data sequence, including the anchored labels, into the plurality of segment types; wherein the modified Viterbi algorithm imposes a constraint regarding re-entry into a particular state of the HMM.

5. Claims 14-16 are allowed because they further limit their parent claims.
6. Regarding claim 17, Solmer *et al.* disclose a HMM based mark-up method including the step of constructing an HMM defining a plurality of hierarchically arranged states ([0101]).

However, Solmer *et al.* do not disclose modifying a Viterbi algorithm, related to the HMM, in order to apply a first multiplicative factor if a first state of the HMM is re-entered and to apply a second multiplicative factor if a second state of the HMM is re-entered, wherein the second state is at a second hierarchical level under the first hierarchical level of the first state; and invoking the modified Viterbi algorithm against at least one information source.

7. Regarding claim 18, Solmer *et al.* do not disclose a method for improving a conventional Viterbi algorithm, the method comprising the step of modifying the determination of δ and Φ of the conventional Viterbi algorithm such that:

- a. for each state $i \in \{1, \dots, N\}$,
 - i. if state i is in re-entry group k ,
 - a) $\delta_1(i, G^k) = \pi_i * b_i(O_1)$; for all $G \neq G^k$, $\delta_1(i, G) = 0$, and
 - b) For all G , $\Phi_1(i, G) = 0$;

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- ii. otherwise, if state i is not in any re-entry group,
 - a) $\delta_1(i, G^0) = \pi_i * b_i(O_1)$; for all $G \neq G^0$, $\delta_1(i, G) = 0$, and
 - b) For all G , $\Phi_1(i, G) = 0$; and
- b. for time $t = 2$ to T ,
 - iii. for each state $i \in \{1, \dots, N\}$,
 - a) for each re-entry state G ,
 - 1) $\delta_t(j, G) = \max_{1 \leq j \leq N} \{ \delta_{t-1}(j, G') * a_{ji} * d(G', i, j) \} * b_i(O_t)$, and
 - 2) $\Phi_t(i, G) = \operatorname{argmax}_{1 \leq j \leq N} \{ \delta_{t-1}(j) * a_{ji} * d(G', i, j) \}$.
- c. wherein G_k , for each re-entry group k , denotes the current number of entries into that particular re-entry group; G denotes a re-entry state comprising a set of values for all G_k ; G^k denotes the re-entry state j that would have led to re-entry state G when moving from state j to state i .

Conclusion

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Hu *et al.* (US Patent 6,542,635) disclose a method of classifying parts of a document into different types using Hidden Markov Models.

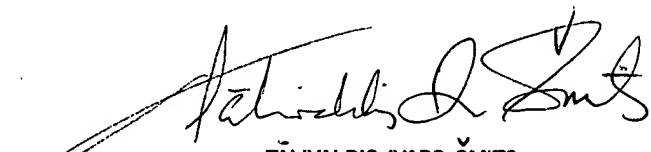
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9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Minerva Rivero whose telephone number is 7573. The examiner can normally be reached on Monday-Friday 9:00 am - 6:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Talivaldis Ivars Smits can be reached on (571) 272-7628. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

MR 4/14/05



TĀLIVALDIS IVARS ŠMITS
PRIMARY EXAMINER